AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-53 (cancelled)

54. (Previously presented) A solar cell comprising:

a germanium substrate; and

a layer of material including In and P disposed directly on the germanium substrate.

55. (Previously presented) A solar cell as defined in claim 54, wherein the layer of material is InGaP.

56. (Previously presented) A solar cell as defined in claim 54, further comprising a top solar subcell formed from InGaP, a middle solar subcell formed from GaAs, and a lower solar subcell formed in the germanium substrate.

57. (Previously presented) A solar cell as defined in claim 54, further comprising a diffused photoactive germanium junction in the substrate.

58. (Previously presented) A solar cell as defined in claim 57, wherein the diffused junction is formed by the diffusion of arsenic into the germanium substrate.

59. (Previously presented) A solar cell as defined in claim 54, wherein the layer of material has a lattice parameter substantially equal to the lattice parameter of the germanium substrate.

60. (Previously presented) A solar cell as defined in claim 54, wherein the layer has a thickness equal to 350 Angstroms or less.

61. (Previously presented) A solar cell defined in claim 54, wherein the cell is capable of photoactively converting radiation ranging from approximately ultraviolet (UV) radiation to radiation having a wavelength of approximately 1800 nm.

62. (Currently amended) A solar cell defined in claim 58, wherein the junction in the germanium substrate layer is located between 0.3 μm [[.mu.m]] and 0.7 μm [[.mu.m]] from the top surface of the germanium substrate.

63. (Previously presented) A solar cell as defined in claim 57, wherein the diffused germanium substrate forms a first cell layer and has a dopant diffusion profile that optimizes the current and voltage generated therefrom.

64. (Previously presented) A solar cell as defined in claim 54, wherein the cell has 1 sun AM0 efficiencies in excess of 26%.

65. (Previously presented) A solar cell comprising:

a germanium substrate;

a solar subcell layer overlying said substrate and composed at least in part of GaAs; and

a barrier layer overlying said substrate and underneath said GaAs-containing layer and functioning to inhibit the diffusion of arsenic from the GaAs-containing layer into the germanium substrate.

66. (Previously presented) A solar cell as defined in claim 65, further comprising a solar subcell formed in the germanium substrate.

67. (Previously presented) A solar cell as defined in claim 66, wherein the subcell formed in the germanium substrate is formed from a n-type germanium overlying a p-type germanium substrate.

68. (Previously presented) A solar cell as defined in claim 67, wherein the n-type germanium layer is formed by diffusion of arsenic into the germanium substrate.

69. (Previously presented) A solar cell a defined in claim 67, wherein the n-type germanium layer is formed by diffusion of phosphorous into the germanium substrate.

70. (Previously presented) A solar cell as defined in claim 67, wherein the n-type germanium layer is formed by diffusion of both arsenic and phosphorous into the germanium substrate.

71. (Previously presented) A solar cell as defined in claim 65, wherein the barrier layer is composed of InGaP; InP, or GaP.

72. (Previously presented) A solar cell as defined in claim 65, wherein the barrier layer has a thickness of approximately 350 Angstroms or less.

73. (Previously presented) A solar cell as defined in claim 65, further comprising a two step diffusion profile in the germanium substrate with two different dopants.

74. (Previously presented) A solar cell comprising:

a first cell including a germanium (Ge) substrate having a diffusion region doped with n-type dopants including phosphorus and arsenic, wherein the upper portion of such diffusion region has a higher concentration of phosphorus (P) atoms than arsenic (As) atoms, and

a second cell including a layer of either gallium arsenide (GaAs) or indium gallium arsenide (InGaAs) disposed over the substrate.

75. (Previously presented) A solar cell as recited in claim 74, further comprising a nucleation layer deposited over said substrate that has a lattice parameter substantially equal to the lattice parameter of the germanium substrate.

76. (Previously presented) A solar cell as recited in claim 75, wherein the nucleation layer is a compound of InGaP.

77. (Currently amended) A solar cell as recited in claim 75, wherein the nucleation layer has a thickness equal to 350 angstroms [[Å]] or less.

78. (Previously presented) A solar cell defined in claim 74, wherein the solar cell is capable of photoactively converting radiation from approximately ultraviolet (UV) radiation to radiation having a wavelength of approximately 1800 nm.

79. (Currently amended) A solar cell defined in claim 74, wherein the junction in the germanium substrate is located between 0.3 μm [[.mu.m]] and 0.7 μm [[.mu.m]] from the top surface of the germanium substrate.

80. (Previously presented) A solar cell as defined in claim 74, wherein the diffused phosphorus and arsenic in the germanium substrate has a diffusion profile that optimizes the current and voltage generated in the first cell.

81. (Previously presented) A solar cell as defined in claim 75, wherein the solar cell has 1 sun AM0 efficiencies in excess of 26%.

82. (Previously presented) A solar cell as defined in claim 74, further comprising a third cell disposed over the second cell layer.

83. (Previously presented) A solar cell comprising:

an upper subcell structure including arsenic (As), and a lower subcell formed from a p-type material including first and second diffusion sublayers, wherein the photoactive junction is formed by arsenic (As) and phosphorus (P) converting a upper diffusion layer to n-type, and at least a portion of the second diffusion sublayer is disposed deeper into the p-type material than the first diffusion sublayer.

84. (Previously presented) A solar cell as recited in claim 83, wherein the first diffusion sublayer has a higher concentration of phosphorus (P) atoms than arsenic (As) atoms, and the second diffusion sublayer has a higher concentration of arsenic (As) than phosphorus (P) atoms.

85. (Previously presented) A solar cell as recited in claim 83, further comprising a nucleation layer deposited over said lower subcell that has a lattice parameter substantially equal to the lattice parameter of the top layer of the subcell.

86. (Previously presented) A solar cell as recited in claim 85, wherein the nucleation layer includes InGaP.

87. (Currently amended) A solar cell as recited in claim 85, wherein the nucleation layer has a thickness equal to 350 angstroms [[Å]] or less.

88. (Currently amended) A solar cell defined in claim 85, wherein the junction in the lower subcell is located between 0.3 μm [[.mu.m]] and 0.7 μm [[.mu.m]] from the top surface of the lower subcell.

89. (Previously presented) A solar cell as defined in claim 85, wherein the depth of the first and second diffusion sublayers is selected to create a dopant diffusion profile that optimizes the current and voltage generated in the lower subcell.

90. (Previously presented) A solar cell defined in claim 85, further comprising a third solar subcell disposed over the upper subcell.

Claims 91-97 (Cancelled)